1. Black Body radiation problem:
   comparison of wavelength peaks:

$$\lambda = \frac{a}{T} = \begin{Bmatrix} \dfrac{2.898\times10^{-3}}{4400} = 6586\ \mathring{A} \\ \dfrac{2.898\times10^{-3}}{6400} = 4528\ \mathring{A} \end{Bmatrix}$$

$$\text{Ratio of Power} = \left(\frac{4400}{6400}\right)^4 = 0.22, \text{or } 22\%$$

2. $R = \sigma\ T^4 \bullet \dfrac{4\pi\ R_\odot^2}{4\pi\ R_{EO}^2}$ where $R_\odot$ is the solar radius, R_{EO} is the radius of earth's orbit, gives best agreement for T = 5800 Kelvin.

3. Pressure = force/area = weight of the atmosphere/area = mass * gravity/area
   take g_{earth} = 10, g_{sun} = 300 m/s^2 (30 times earth). $Mass_{earth} = 5.29\times10^{18}$, $Mass_{solar} = 2.1\times10^{19}$, solar surface area = $4\pi R^2_\odot$, $R_\odot = 6.96 \times 10^8$ m; earth surface area = $4\pi R^2_\oplus$, $R_\oplus = 6.37\times10^6$ m;

$$\text{Earth: pressure} = \frac{10\,\frac{m}{s^2}\bullet 5.3\times10^{18}\ \text{kg}}{4\pi\left(6.4\times10^6\ \text{m}\right)^2} = \frac{5.3\times10^{19}}{5.2\times10^{14}} = 1.0\times10^5\ \frac{\text{Newtons}}{m^2}$$

$$\text{Sun: pressure} = \frac{300\,\frac{m}{s^2}\bullet 2.1\times10^{19}\ \text{kg}}{4\pi\left(7\times10^8\ \text{m}\right)^2} = \frac{6.3\times10^{21}}{6.2\times10^{18}} = 1.0\times10^3\ \frac{\text{Newtons}}{m^2}$$

The ratio is 1:100.

4. Change in energy density:

$$\text{Energy Density} = \frac{B^2}{2\mu_\circ} = \frac{0.3^2}{2\bullet 1.26\times10^{-6}} = 35.8\times10^3\ \text{Joules}/m^3$$

$$\text{Energy} = \text{Energy Density} \bullet \text{volume} = 35.8\times10^3\bullet\left(10^7\right)^3 = 3.6\times10^{25}\ \text{Joules}$$

If a portion of this energy is converted into heat (in the plasma), the decrease of 1.0×10^{25} is a percentage decrease of $100\dfrac{1}{3.6} = 28\%$

5. It looks like 1.5 million degrees comes the closest